

ISSN 1327-8231

# **ECONOMICS, ECOLOGY AND THE ENVIRONMENT**

**Working Paper No. 173**

**Antarctic tourism:  
Environmental concerns and the importance of  
Antarctica's natural attractions for tourists**

**by**

**Clem Tisdell**

**October 2010**



**THE UNIVERSITY OF QUEENSLAND**

**Working Paper No. 173**

**Antarctic tourism:  
Environmental concerns and the importance of Antarctica's  
natural attractions for tourists<sup>\*</sup>**

**by**

**Clem Tisdell<sup>†</sup>**

**October 2010**

© All rights reserved

---

<sup>\*</sup> This is a draft chapter for the book *Nature-based Tourism and Conservation* by Clem Tisdell and Clevo Wilson to be published by Edward Elgar, in 2011. There is some overlap between this paper and No. 102 in this series. Feedback is welcome.

<sup>†</sup> School of Economics, The University of Queensland, St. Lucia Campus, Brisbane QLD 4072, Australia  
Email: [c.tisdell@economics.uq.edu.au](mailto:c.tisdell@economics.uq.edu.au)

WORKING PAPERS IN THE SERIES, *Economics, Ecology and the Environment* are published by the School of Economics, University of Queensland, 4072, Australia, as follow up to the Australian Centre for International Agricultural Research Project 40 of which Professor Clem Tisdell was the Project Leader. Views expressed in these working papers are those of their authors and not necessarily of any of the organisations associated with the Project. They should not be reproduced in whole or in part without the written permission of the Project Leader. It is planned to publish contributions to this series over the next few years.

Research for ACIAR project 40, *Economic Impact and Rural Adjustments to Nature Conservation (Biodiversity) Programmes: A Case Study of Xishuangbanna Dai Autonomous Prefecture, Yunnan, China* was sponsored by the Australian Centre for International Agricultural Research (ACIAR), GPO Box 1571, Canberra, ACT, 2601, Australia.

The research for ACIAR project 40 has led in part, to the research being carried out in this current series.

For more information write to Emeritus Professor Clem Tisdell, School of Economics, University of Queensland, St. Lucia Campus, Brisbane 4072, Australia.

# Antarctic tourism: environmental concerns and the importance of Antarctica's natural attractions for tourists

## ABSTRACT

This article provides general background on the development of tourism in Antarctica and environmental concerns raised by it. However, the major part of it reports on and interprets the results from a survey of tourists visiting Antarctica on a cruise ship. Particular attention is given to the socioeconomic profiles of these tourists, their stated level of knowledge of Antarctica before and after their visit, the relative importance to these visitors of seeing different species of Antarctic wildlife and whether or not the opportunity of seeing Antarctic wildlife was of critical importance for their decision to visit Antarctica. The relative valuation by the sampled tourist of features of their Antarctic cruise is explored along with changes in their attitude to nature conservation following their visit to Antarctica. The opinions of respondents about environmental issues involving Antarctica are summarised and their attitudes towards increased tourism in Antarctica are outlined. The article concludes with a discussion of environmental policy issues raised by the development of tourism in Antarctica.

**Keywords:** Antarctica, Antarctica's natural attractions, cruise ships in Antarctica, environmental conservation in Antarctica, tourism in Antarctica, wildlife conservation in Antarctica.

**JEL Classifications:** L83, Q26, Q57.

## 1. INTRODUCTION

This article draws on the results of surveys of tourists who undertook an Antarctic journey in January 2003 aboard the Antarctic cruise ship, 'Akademik Ioffe'. The prime purposes of these surveys were to determine the socio-economic profile of these travellers, evaluate the importance of Antarctic wildlife for their travel, their attitude to Antarctic wildlife conservation as well as environmental issues involving Antarctica, both prior to their visit to

Antarctica and following it. This article reports on the socio-economic profile of respondents, their willingness to pay for their Antarctic trip, and their knowledge of Antarctica. The comparative importance of Antarctic wildlife as a factor motivating respondents to undertake their journey is assessed and the evaluation of travellers following their Antarctic visit is considered. The relative importance of different Antarctic wildlife species is taken into account as well as Antarctic attractions other than wildlife. The attitudes of respondents to several environmental issues involving Antarctica, (for example, the commercial use of its natural resources and global environmental change impacting on Antarctica) are canvassed and summarised. In conclusion, the relevance of the survey results for Antarctic conservation are discussed. Particular attention is given to the question of whether Antarctic tourism favours or threatens Antarctic nature conservation.

While visits by tourists to Antarctica have increased considerably, Antarctica is still far from a mass tourism destination partly because the cost of an Antarctic cruise is quite high. For example, in January 2003, we asked tourists joining the cruise to Antarctica on the ship 'Akademik Ioffe', 'How much do you expect that you/your accompanying partner/family will have spent per person (approximately) specifically for this journey by the time it ends?'. The mean value mentioned was AUS\$15,540 with a median of AUS\$15,000. The actual cruise was of nine days duration from the Argentinean port of Ushuaia. Approximately 75 per cent of tourists to Antarctica start and finish their journey in this port (Barrio and Roldan, 1997). There has been a rapid increase in the number of tourists visiting Antarctica and this growing interest has resulted in the production of a large guide book (Rubin, 2000) for prospective tourists.

Fifty-two passengers filled out the structured pre-visit survey forms on board this vessel on their way to Antarctica. Fifty passengers filled out post-visit survey forms on their return journeys. The survey forms (pre- and post visit are reproduced in the Appendix to this article). Only one form was completed per party. The questionnaires were designed to detect possible differences between expectations on the outward journey and evaluations after the visit of the tourists to Antarctica.

According to the International Association of Antarctica Tourist Operators (2003), the maximum capacity of the 'Akademik Ioffe' is 117 passengers and it carries an average of 90 passengers per trip. When this survey was conducted 68 passengers were on board and 52

survey forms were completed on the outbound journey; 50 on the return journey. Because only one completed survey was required per party travelling on this ship, coverage of the survey was relatively complete.

## **2. GENERAL BACKGROUND ON TOURISM IN ANTARCTICA AND ENVIRONMENTAL CONCERNS**

### **Growth in tourism**

The International Association of Antarctica Tour Operators (IAATO), claims that Antarctic tourism began in 1966 when Eric Lindblad led the first traveller's expedition to Antarctica on a cruise ship especially built for this purpose (IAATO, 2009a). IAATO states that "he believed that by providing a first-hand experience to tourists you would educate them to the ecological sensitivity of the Antarctic environment and promote a greater understanding of the earth's resources and the important role of Antarctica in the global environment." (IAATO, 2009a).

It was not until after the formation of IAATO in 1991 that statistics began to be collected regularly on tourist visits to Antarctica. In 1992-93, 6,704 seaborne tourists landed in Antarctica. By 2007-08, this had risen (with some fluctuations) to 32,637. However, in 2008-09 the number of sea-borne tourists landing in Antarctica declined to 25,921 and a further decline (to 20,681) in landings was estimated for 2009-2010 season by IAATO. This has been attributed primarily to the global financial crisis.

Commencing in 1999-00, cruise ships carrying passengers who do not come on land began to arrive in Antarctica. In 2007-08, they carried 13,015 passengers but this declined to 10,652 in 2008-09 as a consequence of the global financial crisis.

### **Types of Antarctic tourism**

Sea-borne visits by tourists to Antarctica account for the majority of tourist visits to Antarctica as can be seen from the preliminary estimates of IAATO (IAATO, 2009b see Table 1) for the 2009-10 season. A noticeable feature is the expected increase in the relative importance of seaborne cruise-only tours to Antarctica. This may reflect the increasing

importance of cruise-based tourism globally. Overflights of Antarctica without landing are no longer in demand by tourists.

*Table 1: Preliminary estimates for 2009-10 of IAATO of the number of tourists visiting Antarctica by the type of visit and the percentages of visits by type*

<b>Type of visit</b>	<b>Number of visits</b>	<b>Percentage of total</b>
Seaborne traditional tourism (with landings)	20,681	55.9
Seaborne tourism cruise-only (no landing)	15,531	42.0
Air/Cruise	450	1.2
Air/Land-Based 'traditional' tourism	335	0.9
Overflights (no landing)	0	0
<b>Total of visitors</b>	<b>36,997</b>	<b>100.0</b>

*Source:* Based on IAATO (2009b)

### **Location of visits by tourists**

Most tourism to Antarctica is focussed on the Antarctic Peninsula. The Peninsula accounts for over 97% of visitors whereas visitors to the Ross Sea and Continental Antarctica amount to only about 2.7% of visitors. The proximity of the Antarctic Peninsula to South America influences this pattern. Some scientists believe that the geographical concentration of Antarctic tourism tends to intensify the likely adverse environmental effects on Antarctica from tourism.

### **Costs of cruises and the nationality of tourists**

Antarctica cruises of about 7 days cost from US\$5,000. However, preparing for the journey and travelling to the embarkation point for the cruise can cost more than this. Hence, a cruise to Antarctica is relatively expensive. This is one reason why most Antarctic tourists are from high income countries.

Table 2 shows the composition of tourists landing in Antarctica in the 2002-03 season, the season in which our survey was conducted. Table 3 shows this composition for the 2008-09 season. Based on IAATO data (IAATO, 2009c) almost 86% of passengers came from the higher income countries listed in Table 3. Compared to 2002-03, there were some changes in this composition. For example, the proportionate number of visitors from the USA and Germany fell whereas there was a rise in this for Australia and Canada. Not only do tourists

to Antarctica tend to come from higher income countries but they are usually well educated and older than the average of the population of their countries (Kriwoken and Rootes, 2000).

*Table 2: Composition by nationality of tourists landing in Antarctica, 2002-03*

<b>Country</b>	<b>Number</b>	<b>%</b>
United States	5,343	39.37
Germany	1,948	14.35
United Kingdom	1,779	13.11
Australia	865	6.37
Japan	450	3.32
Canada	409	3.01
Sweden	395	2.91
Others	1,917	14.13
Unknown	465	3.43
<b>Total:</b>	<b>13,571</b>	<b>100.00</b>

*Source:* Based on IAATO (2003, p.21)

*Table 3: Composition by nationality of tourists landing in Antarctica, 2008-09*

<b>Nationality</b>	<b>Number of visitors</b>	<b>% of total</b>
United States	12,837	34.0
United Kingdom	5,496	14.6
Germany	3,842	10.2
Australia	3,035	8.0
Canada	2,350	6.2
Netherlands	1,383	3.7
Switzerland	1,151	3.1
Japan	1,104	2.9
France	739	1.9
New Zealand	457	1.2
Other	5,340	14.2

*Source:* Based on IAATO (2009c, p.5)

According to Rubin (2000, p.108), “One of the most important factors in the large increase in Antarctic tourist numbers during the late 1980s and early 90s was the collapse of the Soviet Union”. Many scientific academies leased their ice-strengthened boats to Western tourist companies to earn much needed income. This is why many of today’s Antarctic tour vessels are Russian registered ships.



## **Environmental issues**

Environmental issues surrounding increasing tourism to Antarctica remain controversial. Views range from the contention that environmental impacts of tourists are minimal and are grossly exaggerated by some of the media and by some environmentalists to the opposite view that these effects are serious, are likely to become more so, and are not sufficiently recognised.

According to Rubin (2000, p.55), for example, “with its extremely harsh climatic conditions, Antarctica has a sensitive ecology. Visitors must respect that sensitivity to ensure that no damage is done... Although tourism to Antarctica is sometimes criticised as being harmful to the Antarctic environment, in truth the impact made by tourists is absolutely minimal when compared to scientific activities on the continent”. He argues that the latter activities account for more than 99 per cent of man-days spent in Antarctica and that the permanent scientific stations involve more substantial negative environmental impacts than Antarctic tourists. While that is a serious environmental issue, it is not a reason for lack of concern about actual and potential environmental impacts of Antarctic tourism.

Adverse effects from Antarctic tourism can come from oil spills, accidents to travel vehicles, trampling on the Antarctic Peninsula, disposal of human wastes and stress placed on some wildlife species by visitors.

The environmental implications of increasing growth and diversity of Antarctic tourism has become of growing concern to Antarctic Treaty members. Concerns include inadequate insurance by some operators, the possibility that tourists may disrupt scientific work and the risks of cumulative environmental impacts combined with the absence of good monitoring programmes (Anon, 2001, p.42).

Nevertheless, it would be wrong to conclude that no legal framework exists for the control and regulation of the development and conduct of tourism in Antarctica. The Protocol on Environmental Protection was added in the 1990s to the Antarctic Treaty to provide for some environmental protection in Antarctica. It is known as the Madrid Protocol and came into effect in 1998.

However, not all of the many Antarctic Treaty nations (for example, India) have drawn up supporting laws and regulations to control the activities of their citizens in Antarctica. Countries such as the US, UK, Australia and New Zealand have. Nevertheless, even when such relevant regulations and laws exist, the matter of their enforcement remains problematic. Sovereignty disputes between a few claimant states (for example, Argentina, Chile and the UK) may be a barrier to regulation in disputed areas. Thirdly, it is one thing to pass laws and regulations and another to monitor compliance with these and enforce them. The cost of policing regulations in Antarctica is high and so even when regulations exist, policing is likely to be very limited. This is not to suggest that the Madrid Protocol has had no impact on environmental protection in Antarctica but rather to suggest that it is of limited effectiveness. For instance, one effect has been for nations with supporting regulations to require environmental impact assessments (EIA) for tourist developments in Antarctica when these are proposed by tourist businesses registered in their country (Kriwoken and Rootes, 2000). Nevertheless, such procedures are far from seamless for reasons outlined by Kriwoken and Rootes (2000).

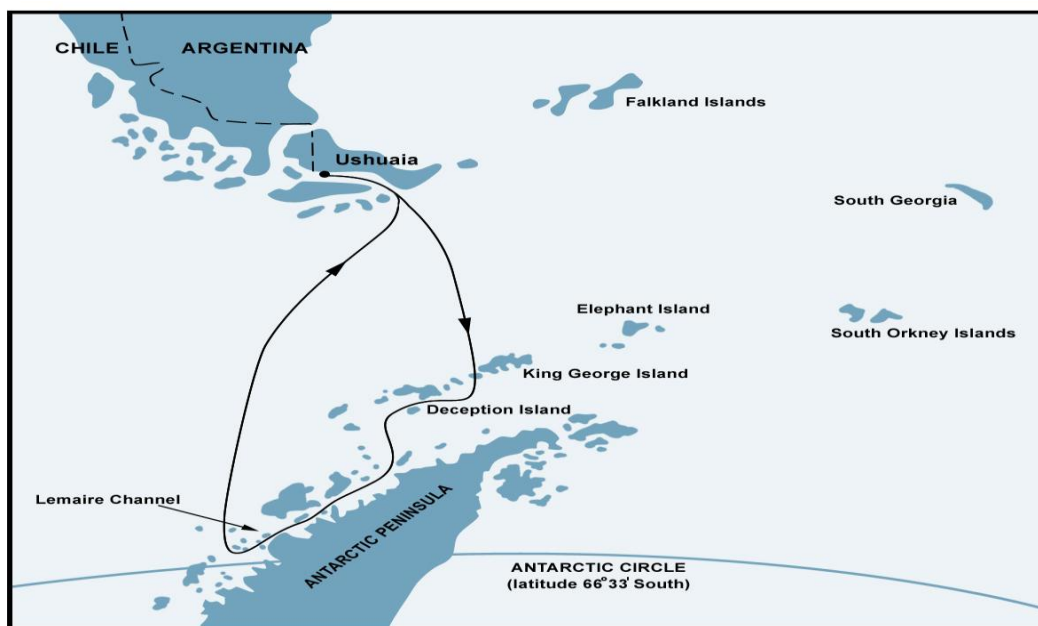
### **IAATO and environmental conduct**

Because of the slow evolution of environmental regulations in Antarctica and shortcomings in these regulations, the International Association of Antarctica Tour Operators (IAATO), an association of tour operators in Antarctica, has adopted a code of environmental conduct for its members. This self-policing system is intended to reduce or better manage the environmental impacts of tourism development in Antarctica. This is a proactive move by IAATO which has increased the focus on environmental issues involving Antarctic tourism.

Nevertheless, self regulation is not the complete solution. While the majority of Antarctic tour operators belong to IAATO, some are not members. Furthermore, the businesses and vessels of some Antarctic tour operators are registered in nations that are not parties to the Antarctic Treaty system. Thirdly, industry codes of conduct are not always complied with by industry members or members of a relevant association. Overall, therefore, environmental regulation in Antarctica seems to be fraught with uncertainty and lacks precision and rigour.

### 3. THE ANTARCTIC JOURNEY AND THE ADMINISTRATION OF THE SURVEY

Passengers travelling on board the ‘Akademik Ioffe’ to the Antarctic Peninsula were surveyed in January 2003. The route of this journey is shown in Figure 1. Passengers travelled by the Russian registered ship the ‘Akademik Ioffe’ on a ten night’s journey leaving from Ushuaia port in Argentina. They crossed the Drake Passage and then travelled west of the Antarctic Peninsula, visiting islands in the associated archipelago, and landing on the west coast of the peninsula, before returning to Ushuaia.



*Figure 1 The route of the trip undertaken by tourists surveyed for this study aboard the ‘Akademik Ioffe’*

The ‘Akademik Ioffe’ was one of two vessels chartered by the Australian-based Peregrine Adventures tour company, which specialises in promoting ecologically based tours. In relation to this tour, the company’s website (2002) stated: “The itinerary focuses on the areas with the greatest promise of wildlife – opportunities abound for viewing and encountering nesting penguins and seals, and whales seem to be everywhere!”.

Two questionnaires were administered to passengers on board the ‘Akademik Ioffe’. Passengers were surveyed prior to arriving in Antarctica and after their departure from

Antarctica using similar questionnaires. This was done to detect any possible changes in their responses as a result of their visit to Antarctica. The questionnaires are appended. Lorna Krikwoken arranged for the survey forms to be distributed aboard the 'Akademik Ioffe' and for their collection on completion. He then sent these to Tisdell and Wilson for processing.

There were 68 passengers on this voyage. Fifty two survey forms were completed for the outbound journeys and 50 on the return journeys. The response rate was high because most respondents were accompanied, and only one survey form per touring party was requested.

#### **4. SOCIO-ECONOMIC PROFILES OF THE RESPONDENTS AND THE COST OF THEIR JOURNEY**

A slight majority of respondents were females (51.9 per cent). Most respondents (76.9 per cent) were accompanied but 23.1 per cent of respondents travelled alone. Only one respondent had previously visited the South Polar Region.

The countries in which the respondents normally reside are shown in Table 4. Only one respondent did not indicate their country of residence but otherwise all were from Western countries, with those from Australia, Sweden and the USA accounting for most respondents. A high number of Australians is not usual for Antarctic trips. Normally, Americans make up the majority of travellers to Antarctica (see Tables 2 and 3). The high proportion of Australians in our sample is a reflection of the location of Peregrine in Australia.

*Table 4: In which country do you normally reside? (Pre-visit question) Distribution of responses*

<b>Country</b>	<b>Frequency</b>	<b>% of total</b>
Australia	20	38.5
Sweden	15	28.8
USA	6	11.5
UK	4	7.7
Italy	2	3.8
Switzerland	2	3.8
Austria	1	1.9
France	1	1.9
No response	1	1.9
<b>Total</b>	<b>52</b>	<b>100</b>

More than half the respondents were over 50 years of age and the modal age group was 51-60. The age distribution of respondents is shown in Table 5. Typically respondents are ‘empty-nesters’ and belong to older age groups. This accords with results from other studies.

*Table 5: To what age group do you belong? (Pre-visit survey) Distribution of responses*

<b>Age in years</b>	<b>Frequency</b>	<b>% of total</b>
20-30	2	3.8
31-40	8	15.4
41-50	8	15.4
51-60	17	32.7
61-70	12	23.1
71-80	2	3.8
81+	0	0.0
No response	3	5.8
<b>Total</b>	<b>52</b>	<b>100.0</b>

Respondents had a high degree of education (see Table 6). This has also been found in other studies, for example, by Kriwoken and Rootes (2000). Almost 75 per cent had university degrees with most in this group having postgraduate degrees.

*Table 6: Indicate your highest educational qualification (Pre-visit survey). Distribution of responses*

<b>Level of education</b>	<b>Frequency</b>	<b>% of total</b>
Primary only	0	0
Some junior schooling	0	0
Completed year 10 secondary or equivalent	1	1.9
Completed year 12 or equivalent	4	7.7
Trade certificate or equivalent	1	1.9
Diploma or equivalent	3	5.8
Degree or equivalent	16	30.8
Post-graduate degree or equivalent	22	42.3
No response	5	9.6
<b>Total</b>	<b>52</b>	<b>100.0</b>

The family income of most of the cruise ship passengers was found to be high. However, this needs clarification. In the survey the respondents were asked to state their family income in their home currency since there were many passengers from different nationalities using various currencies. An income comparison using diverse currencies is difficult and hence, the various currencies were converted into Australian dollars using the prevailing exchange rates at the time. The adjusted family income levels are shown in Table 7. Of the 52 respondents,

in the survey 77 per cent of the respondents answered this question and the rest did not. Of the respondents who did, it is clear that the majority (60 per cent) of the respondents had an income of more than AUS\$100,000. Of those who did not have an income of more than AUS\$100,000, 17.5 per cent had a family income of more than AUS\$50,000, but less than AUS\$100,000. The rest of the respondents (22.5 per cent) had an income of less than AUS\$50,000. A closer examination of data show that the majority (90 per cent) of those having a family income less than AUS\$50,000 were Swedish and close to half (44 per cent) of them were retirees perhaps using their savings to make this journey. This partly explains how those with less than AUS\$50,000 family income could undertake an expensive journey such as this to Antarctica. Another 44 per cent of this group belonged to the 51-60 age category perhaps using up their savings to undertake this journey. Only 11 per cent of this group of passengers who had a family income of less than AUS\$50,000 belonged to the 20-30 age group. These were single.. Therefore, the data show that in addition to the level of income, other factors such as being able to use up savings, empty-nesters and being single also influence the affordability of the journeys and that affordability is not solely explained by income levels. Nevertheless, the results accord with the finding of Kriwoken and Rootes (2000) that most Antarctic tourists have a high level of income or are wealthy.

*Table 7: Your family income level per annum in your home currency? (Pre-visit survey)  
Distribution of responses*

<b>Family income range (in AUS\$)</b>	<b>Number</b>	<b>Frequency (%)</b>
Below 25,000	1	2.5
25,001-50,000	8	20.0
50,001-75,000	6	15.0
75,001-100,000	1	2.5
100,001-125,000	8	20.0
125,001-150,000	1	2.5
150,001-175,000	2	5.0
175,001-200,000	3	7.5
200,001-225,000	3	7.5
225,001 and above	7	17.5
<b>Total</b>	<b>40</b>	<b>100.0</b>

*Note:* 12 respondents did not answer this question

Respondents indicated in the pre-visit and post-visit surveys that, on average, they would have been prepared to pay more for their trip than they actually paid. The study tried to determine the views of visitors about what they had actually paid for the journey and what

they would be willing to pay after the journey. In order to make a comparison, it is necessary to compare those who had stated how much they had actually paid and how much they were willing to pay after the visit. There were only 33 respondents who had answered the pre- and post-visit questions. From this limited data, it seems that the amount of money spent on the journey was consistent with the expectations of the visitors. For example, the pre-visit mean of expenditure by these 33 respondents was AUS\$14,194 and the post-visit mean was AUS\$14,362 which is only marginally larger. These figures differ from those given in Section 1 because those in Section 1 are based on 47 responses.

Some of the comments from respondents received after their journey about the cost of their journey were:

- Quite expensive.
- It is too much!!
- Just within my reach.
- We spent three-quarters of our savings on this journey; a life-long dream for my husband but still cannot justify the expense. We would have spent \$15,000 for this dream.
- It was a lot of money compared to travelling to other areas of the world but a great one off.
- It was about AUS\$2,000 over my budgeted amount but worth it.
- Well worth it for the experience.

## **5. PRIOR AND POST VISIT KNOWLEDGE OF ANTARCTICA**

Respondents were asked whether they considered their knowledge of Antarctica to be poor, average, good or excellent. Most considered their knowledge before their visit to be average but after their visit, most rated their knowledge of Antarctica as good, a rating above the average. In general, there was a sharp rise in the perceived level of knowledge of respondents about Antarctica. Weighting poor as one, average as 2, good as 3 and excellent as 4, the weighted average of knowledge of respondents of Antarctica rose from 2.23 pre-visit to 2.84 following their visit. The upward shift in the distribution is evident from Table 8.

Table 8: *Do you regard your current knowledge of Antarctica/sub-Antarctica as excellent, good, average or poor? Distribution of responses*

Rating	Pre-Visit		Post-Visit	
	Frequency	%	Frequency	%
Excellent	1	1.9	3	6
Good	16	30.8	38	76
Average	29	55.8	7	14
Poor	6	11.5	2	4
<b>Total</b>	<b>52</b>	<b>100.0</b>	<b>50</b>	<b>100</b>
(a)Index of knowledge		2.23		2.84

(a) Index of knowledge calculated using the following weights:

Excellent knowledge = 4

Good knowledge = 3

Average knowledge = 2

Poor knowledge or no response = 1

Prior to their visit, just under 40 per cent of respondents said that they had read widely about Antarctica and around 55 per cent said they had watched many TV programmes on Antarctica. Nevertheless, a substantial proportion of the respondents did not have such exposure before their journey. In other words, many of these tourists were not well informed about Antarctica before their journey. This diversity of knowledge of buyers (tourists) about tourist attractions and its imperfection is consistent with findings reported in Chapters 7 and 8 (Tisdell and Wilson, forthcoming). It is not taken into account in neoclassical economic theories of choice by consumers or tourists.

## 6. THE IMPORTANCE TO TOURISTS OF VIEWING ANTARCTIC WILDLIFE PRE- AND POST-VISIT AND THEIR STATED SATISFACTION EXPECTED AND OBTAINED

Prior to their visit, 94.2 per cent of respondents said they were interested in Antarctic wildlife and 5.8 per cent said they were not. Of those interested in Antarctic wildlife, their greatest interest was shown in penguins, followed by whales and dolphins, and then seals.

The stated interest of respondents in Antarctic wildlife species before and after their visit is shown in Table 9. Penguins continued to be of greatest interest and whales and dolphins of second highest interest after the journey. A major change, however, was the very substantial



rise in valuations of sea birds (other than penguins) following the visit of respondents to Antarctica. Most respondents said that they became more interested in Antarctic wildlife following their visit.

*Table 9: If you are interested in Antarctic wildlife, is your interest mainly in which species listed? (You may tick more than one box) Distribution of responses*

<b>Type of wildlife</b>	<b>Pre-Visit</b>		<b>Post-Visit</b>	
	<b>Frequency</b>	<b>%</b>	<b>Frequency</b>	<b>%</b>
All wildlife	33	32.7	24	25.8
Penguins	27	26.7	25	26.9
Whales and dolphins	24	23.8	18	19.4
Seals	14	13.9	10	10.8
Other polar seabirds	3	3.0	16	17.2
<b>Total</b>	<b>101</b>	<b>100.0</b>	<b>93</b>	<b>100.0</b>

The majority of respondents suggested that a special feature of Antarctic wildlife is that most species do not occur elsewhere. The proportion saying this was about the same before and following their visit. Prior to their visit to Antarctica about 40 per cent of respondents said that Antarctic wildlife can be easily seen in large numbers whereas after their visit this rose to 54 per cent. While the majority of respondents stated on their outbound journey that the adaptations of Antarctic wildlife would be a special attraction, only a half said this on the return journey. As for other features and comments, on the outward journey some respondents said they would be able to get close to the wildlife and many thought that it would be a special attraction to see Antarctic wildlife in its natural environment. Getting close was not, however, mentioned in the post-visit survey responses but seeing wildlife in their own environment was. One respondent said that the journey enabled him/her to see several new bird species for the first time.

Following their cruise, 94 per cent of respondents said that they had learnt more about Antarctica and its wildlife as a result of their cruise and 76 per cent said that they had become more aware of conservation issues involving Antarctica wildlife. Nearly all (94 per cent) were in favour of conserving Antarctic wildlife, none expressed opposition to it but 6 per cent did not respond.

The importance placed by respondents on seeing Antarctic wildlife increased as a result of their cruise, see Table 10. This result is also supported by the increase in the weighted average of the importance of seeing wildlife. To calculate this index ‘no response’ or ‘of no importance’ responses are weighted as zero, ‘not very important’ as 1, ‘important’ as 2, and ‘very important’ as 3. This index increased from 2.48 prior to the journey to 2.66 after it. Although 70 per cent of respondents were satisfied with their wildlife watching experience in Antarctica, 30 per cent were not satisfied.

*Table 10: Responses to the questions: (Pre-Visit): How important was the possibility of seeing Antarctic/Sub-Antarctic wildlife in your decision to come on this journey? (Post-Visit): How important was seeing Antarctic/Sub-Antarctic wildlife during this cruise? Distribution of responses*

Rating	Pre-Visit		Post-Visit	
	Frequency	%	Frequency	%
Very important	32	61.5	37	74
Important	13	25.0	11	22
Not very important	7	13.5	0	0
Of no importance or no response	0	0.0	2	4
<b>Total</b>	<b>52</b>	<b>100.0</b>	<b>50</b>	<b>100</b>
(a)Index of importance		2.48		2.66

(a)Index is calculated on the basis that  
 Not important or No response = 0,  
 Not very important = 1,  
 Important = 2,  
 Very important = 3

The importance of Antarctic wildlife as an attraction for Antarctic tourists is evident from responses to a pre-visit question. Respondents were asked: ‘If there was no wildlife to be seen in the South Polar Region, would you have still decided to come on this cruise, given your present costs’. The majority (61.5 per cent) said ‘No’, 34.6 per cent said ‘Yes’ and 3.8 per cent did not respond. Furthermore, 53.1 per cent of those saying ‘No’ said that they would not come on this cruise even if it were much cheaper should there be no Antarctic wildlife.

Some of the reasons given by those who said they would have decided to join the cruise even in the absence of Antarctic wildlife are as follows:

- The ruggedness/isolation/ice/wind etc, landscapes.
- Because I am also interested in geology/science.

- Wonderful scenery.
- To see scenery in the region, ice, etc.
- More to see than I thought.
- Probably if the landscape is beautiful.
- It would have been a travelling option.
- Interest in photography (scenery) and plants.
- Fascinated by the icebergs and sheer isolation.
- The nature, landscape is .... There.

Comments from those who said they would not join the cruise in the absence of Antarctic wildlife were as follows:

- Would not be a complete experience.
- Wildlife factor is most important.
- Wherever I go wildlife is my major interest along with people and cultural differences.
- Can visit glaciers/national parks for much fewer dollars without requirement of a boat trip.
- For me, the interactive behaviour of wildlife with its environment is very important to see/understand.
- Wanted to see wildlife.
- Absolutely impossible to say, completely theoretical question, we go for the existing Antarctica as it is.
- Ice I can see at home.
- Appearance/experience of ice alone is not sufficient.

Following their cruise, however, 50 per cent of respondents stated that they would still have enjoyed their cruise if they had not seen any wildlife, 34 per cent said they would not have and 16 per cent did not reply. While many respondents still said they would have enjoyed their cruise in the absence of wildlife, it is nonetheless clear that for most, wildlife is a highly significant contributor to their willingness to visit Antarctica and to the level of their enjoyment of it.

On the outward journey, all respondents expected to see whales and dolphins, penguins, seals, and all (except one) expected to see polar seabirds, other than penguins. Respondents were asked to say how much seeing this wildlife would add to their satisfaction along a scale of ‘not at all’, ‘a little’, ‘much’ and ‘very much’. Whales, dolphins and penguins topped the list in terms of expected added satisfaction, followed by seals and their relatives, and then polar seabirds other than penguins. Nearly all respondents said after their Antarctic visit that they had seen those species. The added satisfaction they claimed to have obtained by seeing them, accorded with their original expectations about how much relative extra satisfaction they would obtain if they saw these species. Seeing whales and dolphins was said (on average) to add most to satisfaction followed by penguins, seals and their relatives, and then polar birds (other than penguins). These results are summarised in Table 11.

*Table 11: Index<sup>(a)</sup> of satisfaction anticipated from seeing Antarctic wildlife species based on responses to the following question: Pre-Visit (Q9). Please tick in the second column if you expect to see any of the following wildlife in Antarctica or Sub-Antarctica during this cruise. Would it increase your satisfaction (1) a little; (2) much; (3) very much; or (4) not at all to see the following wildlife? Please put the appropriate number in the last column. Post –Visit (Q6). Tick in the second column if you saw any of the following wildlife in Antarctica or Sub-Antarctica during this cruise. Did they increase your satisfaction (1) a little; (2) much; (3) very much; or (4) not at all to see the following wildlife?*

Type of wildlife	Pre-Visit	Post-Visit	Change in value of index	% variation in index
Whales and dolphins	2.33	2.19	-0.14	-6.01
Penguins	2.31	2.15	-0.16	-6.93
Seals (and relatives)	1.98	1.96	-0.02	-1.01
Polar seabirds (other than penguins)	1.71	1.66	-0.05	-2.92

<sup>(a)</sup>Index of added satisfaction calculated using the following weights:

Very much = 3

Much = 2

A little = 1

Not at all/No response = 0

Nevertheless, one should be cautious in drawing conclusions from Table 11 for the reasons discussed in Chapter 1 (Tisdell and Wilson, forthcoming). This is because the responses are based on an ordinal (and to some extent subjective) Likert-like scale. In calculating the index, it is assumed to be legitimate to assign cardinal values to the responses and weight these to calculate a simple average. Nevertheless, the results are consistent with the view that penguins and whales (including dolphins) are the major wildlife attractions for tourists

visiting Antarctica and that seeing seals and polar seabirds (other than penguins) is an additional attraction.

## 7. VALUATION OF FEATURES OF THE ANTARCTIC CRUISE AND CHANGES IN ATTITUDES TO CONSERVATION

Respondents were requested to rank various features of their cruise prior to their visit to Antarctica and to rank the same set of features after their visit using a scale of ‘very important’, ‘important’, ‘not very important’ or ‘of no importance’. Weighting these rankings as 3, 2, 1 and zero respectively and treating a non-response as indicating ‘no importance’, the weighted means before and after visits to Antarctica are as set out in Table 12.

*Table.12: Average weighted indices <sup>(a)</sup> of importance to respondents of features or attributes of Antarctica/Sub-Antarctica prior to and following their visit. Changes in indices are also shown.*

Features	Pre-Visit index	Post-Visit index	Change in value of index	% variation in index
Landscapes and seascapes	2.75	2.74	-0.01	-0.36
Wildlife	2.60	2.56	-0.04	-1.54
Different or unique environment	2.58	2.52	-0.06	-2.33
Unspoilt wilderness	2.58	2.48	-0.1	-3.88
Antarctic summer	2.12	1.94	-0.18	-8.49
The thrill of expedition	1.98	1.90	-0.08	-4.04
Continent without permanent human habitations	1.69	1.82	0.13	+7.69
Few others have visited it	1.50	1.52	0.02	+1.33
Connections with explorers	1.40	1.40	0	0.00
Ship cruise pleasures	0.73	1.20	0.47	+64.38

<sup>(a)</sup> Index of importance calculated using the following weights:

Very important = 3

Important = 2

Not very important = 1

Of no importance/No response = 0

From Table 12, it can be seen that respondents ranked Antarctic landscapes and seascapes as the most important feature (both pre- and post-visit) followed by wildlife. Various Antarctic cruise features are also ranked in Table 12 by the index of importance given to them by respondents before their Antarctic visit. On average, the rank ordering by respondents

remained the same after their visits as before their visits. While most indices of importance showed little change before and after the Antarctic visit by respondents, a few showed substantial variation. Appreciation of ship cruise pleasures increased by a comparatively large amount and the fact that Antarctica is a continent without permanent human habitation also increased as did, to a small extent, the realisation that few others have visited Antarctica. Most other items showed only small declines in their ratings of importance. However, the importance of the Antarctic summer as an attraction showed a decline of around eight per cent, as measured by the index of importance.

There was an increase in the degree of advocacy of respondents of nature conservation following their visit to Antarctica, as can be seen from Table 13. However, the index in Table 13 fails to indicate fully the extent to which tourists increased their advocacy of conservation after visiting Antarctica. If non-responses are ignored (and not treated as showing a neutral attitude towards conservation), the index of advocacy of conservation rises from 1.58-1.77 following the visit of tourists to Antarctica. More significantly, there is a sharp rise in the proportion of respondents saying they are either extremely strong or strong advocates of conservation. Their proportion rises from 50% before the visit to Antarctica to 70.2% following this visit. Furthermore, whereas some respondents expressed a neutral attitude to conservation prior to their visit to Antarctica, all respondents expressed positive support for conservation following their visit. It is, therefore, safe to conclude their visit to Antarctica fostered a pro-conservation attitude among responding travellers. The results therefore, lend support to Eric Lindblad's view that experiences of tourists in Antarctica can generate increased support for conservation. However, the strength of the conservation stimulus from this experience may decay with the passage of time in accordance with the theory outlined by Tisdell et al. (2008). Because our survey was administered to tourists soon after their visit to Antarctica, support for Antarctic conservation may have been at a high level then.

*Table 13: Attitudes of respondents to nature conservation based on responses to pre-visit and post-visit questions. Pre-Visit (Q8). How would you rate your attitude towards conservation. Post-Visit (Q14). How would you rate your attitudes towards nature conservation after your experience of Antarctica. Distribution of responses*

Attitude to nature conservation	Pre-Visit		Post-Visit	
	Frequency	%	Frequency	%
Extremely strong advocate	6	11.5	3	6
Strong advocate	20	38.5	30	60
Moderate advocate	24	46.2	14	28
Neutral towards this subject	2	3.8	0	0
More oriented towards development than conservation	0	0	0	0
No response	0	0	3	6
<b>Total</b>	<b>52</b>	<b>100</b>	<b>50</b>	<b>100</b>
Index of environmental advocacy <sup>(a)</sup>	1.58		1.66	

(a) Index of environmental advocacy calculated with the following weights:

Extremely strong advocate = 3

Strong advocate = 2

Moderate advocate = 1

Neutral towards this subject = 0

No response = 0

More oriented towards development than conservation = -1

On the whole, the importance placed by respondents on natural environments and wildlife in Antarctica as a part of their cruise expectations and experience appear to be much the same before their visit and following it. There was, however, an increase in their advocacy of nature conservation following their visit to Antarctica. In addition, expectations about seeing different species of Antarctic wildlife and stated realisation of satisfaction from doing so were quite similar in both pre- and post-visit.

## 8. OPINIONS OF RESPONDENTS ABOUT VARIOUS ENVIRONMENTAL ISSUES INVOLVING ANTARCTICA

Several environmental issues involving Antarctica were raised with respondents by asking similar questions before their visit and following it. This was done to assess the general attitudes of respondents to such issues and to detect any changes as a result of their visit to Antarctica.

Before their visit, 80.8 per cent of respondents said that they believe that global warming is melting icebergs in Antarctica. This fell slightly to 76 per cent in the post-visit survey. However, there was a slight increase in the percentage of respondents saying that they would like more action to be taken to reduce such melting. Almost 95 per cent of those respondents who were convinced that global warming is melting Antarctic icebergs thought that more action should be taken to reduce such melting (see Table 14).

*Table 14: If you believe global warming is melting icebergs in Antarctica, would you like action to be taken to reduce such melting? Distribution of responses*

<b>Response</b>	<b>Pre-Visit</b>	<b>Post-Visit</b>
	<b>Relative frequency %</b>	<b>Relative frequency %</b>
Yes	92.9	94.7
No	0.0	2.6
No response	7.1	2.6
<b>Total</b>	<b>100.0</b>	<b>100.0</b>

Around 75 per cent of the respondents were opposed to krill harvesting in Antarctica but 9.6 per cent favoured it in the pre-visit survey. Those in favour rose to 14 per cent in the post-visit survey (see Table 15).

*Table 15: Do you think that krill harvesting should continue in Antarctica? Distribution of responses*

<b>Response</b>	<b>Pre-Visit</b>	<b>Post-Visit</b>
	<b>Relative frequency %</b>	<b>Relative frequency %</b>
Yes	9.6	14
No	75.0	74
No response	15.4	12
<b>Total</b>	<b>100.0</b>	<b>100</b>

Most respondents (over 90 per cent) were opposed to Antarctica's vast non-living natural resources (eg. petroleum, minerals, water) being commercially exploited for consumptive use. This is evident from Table 16.



Table 16: *Are you in favour of Antarctica's vast resources (eg. petroleum, minerals, water) being exploited? Distribution of responses*

<b>Response</b>	<b>Pre-Visit</b>	<b>Post-Visit</b>
	<b>Relative Frequency %</b>	<b>Relative Frequency %</b>
Yes	0.0	2
No	92.3	94
No response	7.7	4
<b>Total</b>	<b>100.0</b>	<b>100</b>

Furthermore, over 90 per cent of respondents wanted Antarctica to be preserved in a pristine state (see Table 17), with a slight rise in this percentage being evident following the visits by respondents. The most frequently given reason was because it was seen as unique (see Table 18). The mere knowledge that Antarctica would remain unspoilt was also frequently mentioned as a reason for preserving it in a pristine state (existence value), as well as its influence on the Earth's climate, an indirect use value. The desire to retain the uniqueness and unspoilt character of Antarctica reflects the non-use values. Use values such as tourism potential and conservation of resources for future use were mentioned very infrequently as a reason for wanting to conserve Antarctica in a pristine state. Bequest and altruistic values ('I would like my children and others to enjoy it') were mentioned relatively frequently. No major changes (between responses on the outward journey and the return one) occurred in the relative frequencies with which the reasons were given for wanting to conserve Antarctica in a pristine state. There was very little support for the conservation of Antarctica's resources for future (consumptive) use.

Table 17: *Do you want Antarctica (including wildlife, plant life and its landscape) to be preserved in its pristine state? Distribution of responses*

<b>Response</b>	<b>Pre-Visit</b>	<b>Post-Visit</b>
	<b>Relative frequency %</b>	<b>Relative frequency %</b>
Yes	92.3	94
No	1.9	4
No response	5.8	2
<b>Total</b>	<b>100.0</b>	<b>100</b>

Table 18: *The distribution of reasons given by those who said they want Antarctica (including its wildlife, plant life and its landscape) to be preserved in its pristine state*

Reason	Pre-Visit		Post-Visit	
	Frequency	% of Total responses	Frequency	% of Total responses
It is unique	46	28.9	47	29.2
It has a large influence on the Earth's climate	38	23.9	37	23.0
I would like to know that it could remain unspoilt	36	22.6	37	23.0
I would like my children and others to enjoy it	26	16.4	28	17.4
It has tourism potential	7	4.4	7	4.3
It has great resources that could be used in the future	6	3.8	5	3.1
<b>Total</b>	<b>159</b>	<b>100.0</b>	<b>161</b>	<b>100.0</b>

Opinions were divided about whether there should be increased tourism activity in Antarctica. Around half of respondents were against it whereas about 40 per cent favoured it. The results are summarised in Table 19.

Table 19: *Are you in favour of increased tourism in Antarctica? Distribution of responses*

Response	Pre-Visit	Post-Visit
	Relative frequency %	Relative frequency %
Yes	40.4	38
No	50.0	54
No response	9.6	8
<b>Total</b>	<b>100.0</b>	<b>100</b>

Comments by those respondents who favoured increased tourism into Antarctica included the following:

- It is inevitable, need to be proactive in developing an action plan.
- Public awareness.
- If environmental impact is managed.
- Good education.
- Controlled tourism allows populations to experience this wilderness and will motivate them to help preserve it.

- To give others the opportunity to experience Antarctica as we have.
- People who have seen Antarctica will probably be in favour of preserving it.
- Awareness.
- The unique experience.
- Done in sensitive ways to inform the world about this treasure.
- Learning.
- It was great to see it.
- If controlled.
- To get to understand it.
- To encourage more donations and better protection of wildlife.

Comments by respondents who opposed increased tourism to Antarctica included the following:

- Inevitable damage.
- Difficult to control.
- Increased tourism can only mean increased impact on wildlife and environment.
- Not to disturb wildlife.
- Increased activity likely to result in increased impact.
- Limit the numbers to preserve wilderness.
- Would spoil it.
- More people than come now could have an adverse effect.
- Seems to be well managed at existing tourism levels.
- At present there seems to be no impact analysis.
- Consequences.
- Not to damage and disturb wildlife.
- Save the nature.
- Mass tourism will damage some spots at least.
- Damage.
- Not to spoil Antarctica.
- More chance of damage.
- Pollution.

- Environmental issue.
- To maintain environment.
- Greater risk of pollution and damage to ecosystems.
- Disturbance of wildlife.
- Keep it pristine/pure.
- Destruction to environment.

A high proportion of respondents (around 90 per cent) favour the Antarctic continent and surrounding seas being declared a world park and for it to be managed under the auspices of the United Nations and/or by the twelve Antarctic Treaty Nations. [These are the original claimant nations and do not include all Antarctic Treaty Nations]. Although there was some increase in opposition to this in the post-visit survey, no major change is apparent (see Table 20).

*Table 20: Are you in favour of the Antarctic continent and surrounding seas being declared a world park and managed under the auspices of the United Nations and/or by the twelve Antarctic Treaty nations? Distribution of responses*

<b>Response</b>	<b>Pre-Visit</b>	<b>Post-Visit</b>
	<b>Relative frequency %</b>	<b>Relative frequency %</b>
Yes	90.4	88
No	1.9	6
No response	7.7	6
<b>Total</b>	<b>100.0</b>	<b>100</b>

Respondents were in addition asked ‘If an organisation such as the United Nations were to raise money to declare Antarctica and the surrounding seas as a world park and conduct further research into its unique wildlife and landscapes/seascapes, would you be willing to make an annual contribution for the next ten years’? The percentage of respondents’ pre-visit who said ‘Yes’ was 46 per cent and this rose to 54 per cent post-visit. Those who said ‘No’ declined from 52.7 per cent pre-visit to 26 per cent post-visit whereas the percentage of non-respondents declined slightly. The results are shown in Table 21.

*Table 21: If an organisation such as the United Nations were to raise money to declare Antarctica and its surrounding seas as a world park and conduct further research into its unique wildlife and landscape/seascapes, would you be willing to make an annual contribution for the next ten years? Distribution of responses*

<b>Response</b>	<b>Pre-Visit</b>	<b>Post-Visit</b>
	<b>Relative frequency %</b>	<b>Relative frequency %</b>
Yes	46.2	54
No	32.7	26
No response	21.2	20
<b>Total</b>	<b>100.0</b>	<b>100</b>

Reasons given by those who said they would not contribute included the following:

- I prefer to make donations to charities that improve the lives of humans.
- Money should come from countries involved in Antarctic Treaty.
- I would need to know what the purpose of the contribution is first.
- Should be funded by states in the UN.
- Study funding should be supported by tourism access (charge per visit).
- This is a state/government responsibility.
- Would give to other priorities.
- My first option is the Scandinavian area.
- Can't make decisions based on a 10 year plan.

It is worth noting that under The Protocol to the Antarctic Treaty on Environmental Protection (Madrid Protocol) Article 2 declares that “The Parties commit themselves to the comprehensive protection of the Antarctic environment and dependent and associated ecosystems and hereby designate Antarctica as a natural reserve, devoted to peace and science”. Hence, it is a declared natural reserve. This in itself, however, does not ensure that it is managed as a strict nature reserve and that its pristine nature will necessarily be preserved.

## **9. A SUMMARY OF THE SURVEY RESULTS**

Representatives of virtually all travellers on the 'Akademik Ioffe' completed the questions for this survey during their journeys to and from Antarctica for two of its trips in January 2003. Respondents were found, on the whole, to be relatively well-off economically, to be well educated and typically they were over 50 years of age. Prior to their visit most respondents regarded their knowledge of Antarctica to be 'average', but this rose to 'good' following their visit.

Prior to their visit, most respondents (86.5 per cent) thought that the presence of Antarctic wildlife was a very important or an important reason for their joining the cruise, although 13.5 per cent thought it was not a very important reason for this. After their visit, 96 per cent of respondents stated that seeing Antarctic wildlife was a very important or an important feature of their cruise and no one stated that it was not very important. However, two individuals did not respond. Answers by respondents indicated that (on the whole) their valuation of the importance of Antarctic wildlife as an attraction rose as a result of their cruise. Penguins vied with whales and dolphins as being of particular interest or importance to the responding tourists. Seeing these animals added most to the satisfaction of respondents.

Most ratings of respondents about the importance of natural attributes or features of Antarctica and their cruise remained relatively unchanged before and after their visit. Landscapes and seascapes were on average rated as most important in relation to this cruise both before and after visits to Antarctica, followed in importance by wildlife. The attributes of 'different or unique environment' and 'unspoilt wilderness' continued to be highly ranked in importance both pre- and post-visit. The largest comparative increase in importance following the visit was for 'ship cruise pleasures'. Attitudes of respondents in favour of environmental conservation strengthened considerably following their visit to Antarctica.

As for environmental policy in Antarctica, nearly all respondents thought that more action should be taken to reduce the melting of icebergs as a result of global warming, most were against the consumptive use of Antarctica's natural resources, and most favoured the conservation of Antarctica in a pristine state. Attitudes in relation to these matters did not change very much after the visit of respondents to Antarctica. Support by respondents for these objectives was already high prior to their visit and although support for these objectives

rose the scope for an increase was small. While there is some difficulty in interpreting reasons given by respondents for wanting to conserve Antarctica in a pristine state, non-use economic values appear to be of predominant importance.

Respondents were divided about whether there should be increased tourism activity in Antarctica. A half of the respondents were against it prior to their trip to Antarctica and this increased slightly following their visit. On the other hand, 40 per cent of respondents said prior to their visit to Antarctica that they favoured increased tourism activity in Antarctica but this fell slightly (to 38%) following their visit. Many of those who favoured increased tourism in Antarctica qualified their answer, for example, by saying that safeguards should be imposed to ensure that the increased tourism does not jeopardise environmental conservation.

Around 90 per cent of respondents favoured the declaration of the Antarctic and surrounding seas as a world park managed under the auspices of the United Nations and/or by the twelve Antarctic Treaty nations. However, only about half of respondents said that they would be prepared to donate funds for this enterprise. There was, however, some increase in the proportion of respondents who said they were willing to donate once they had visited Antarctica. In addition, although a third of respondents said they would not donate when asked prior to their visit to Antarctica, this fraction fell to a quarter after their visit. Since the question of the contribution is hypothetical, upward bias may be present in the respondents' expressed willingness to donate funds to support the creation of and maintain an Antarctic world park. Nevertheless, very strong support clearly exists amongst this sample of tourists for the idea that the Antarctic continent and surrounding seas should be a world park managed under the auspices of the United Nations and/or by the twelve Antarctica Treaty nations. About 90 per cent of respondents favoured this proposal. This is consistent with the view that most tourists to Antarctica are likely to be advocates of its environmental conservation even prior to visiting it.

It seems that visits to Antarctica by the tourists sampled tended to reinforce their pre-existing values and to a considerable extent, their preconceptions. It is possible that tourist experiences may reinforce the preconceptions of most tourists about the places they visit. Differences between pre- and post-tourist expectations and valuations are worthy of more investigation because diverse reactions are possible. For example, depending upon their predisposition, some tourists may typically rate their tourism experience as positive and

others may normally rank it as negative after the event: some normally tend to give praise and others might typically be grumblers. Such psychological factors have important implications for the import and validity of stated preference methods of valuation, for example, for the results obtained by applying the contingent valuation method. Fortunately, economists are paying increasing attention to psychological factors and observed behavioural patterns as influences on human behaviour and valuation. Therefore, reliance on introspection as a basis of economic theory is becoming less common.

## **10. CONCLUDING COMMENTS**

Antarctic tourists in large numbers can endanger the relatively pristine state of Antarctica, especially in the absence of appropriate environmental management. Furthermore, apart from the volume of visitors to Antarctica, the geographical distribution of their visits is very important. Presently, tourism is concentrated on the Antarctic Peninsula and particularly on a few tourist ‘hotspots’ there, and nearly all such spots are shoreline and coastal ones (Barrio and Roldan, 1997).

While a voluntary association of Antarctic tourist operators exists, [International Association of Antarctica Tour Operators, (IAATO)] with a code of conduct favourable to environmental conservation, not all Antarctic tourism operators belong to it. Furthermore, it is not known how rigorously members observe the code of conduct of IAATO. In addition, the nature and extent of cumulative-type impacts associated with Antarctic tourism have not been adequately studied.

Johnson and Kriwoken (2009, p.7) that

“Increasing operations [in Antarctica and sub-Antarctica] by non-IAATO members threatens Australia’s policy reliance on industry self-regulation and will prove difficult for Australian policy makers to ignore, particularly in light of the potential resource implications. It is anticipated that Australia may be expected to take a more active regulatory role when assessing non-IAATO operator proposals. Consideration should be given to incorporating IAATO operating standards and procedures into the Australian legal framework”.



Issues involved in Australia Antarctic tourism are discussed further in Johnson and Kriwoken (2007). Nevertheless, the Australian Government does attempt to regulate tourism in its Antarctic and sub-Antarctic territory so as to minimize its ecological and environmental impacts and it does not permit tourism infrastructure in the Australian Antarctic Territory nor in its sub-Antarctic islands.

Concerns have been expressed about the number of large cruise ships visiting Antarctica and the likely increase in this number. For example, in an anonymous overview to a report of the Cooperative Research Centre for Sustainable Tourism (Anon, 2009, p.4), it is stated:

“Up until recently the majority of Antarctic tourists visited over the austral summer aboard small expedition style ships carrying 50 to 100 passengers. As the number of tourists increase so does the size and capacity of ships. Some large commercial tourist ships now carry over 3,000 passengers and crew. This poses new challenges relating to the ability of these ships to operate safely in Antarctic conditions. An additional trend is the diversification of activities offered by tourism companies in a highly competitive market”.

It should, however, be pointed out that passengers on these cruises do not land in Antarctica. A problem, however, is the possibility of accidents at sea resulting in oil spills and these cruise ships most likely discharge wastes from on board into marine waters in Antarctica.

Concerns about oil spills as a result of cruise ships possibly colliding with icebergs in the Antarctic have resulted in the International Maritime Agency of the United Nations banning, as from August 2011, cruise ships carrying heavy oil from operating in Antarctic waters (Saurine, 2010). This effectively limits Antarctic expedition vessels to those carrying 500 or fewer passengers and using light oil for fuel. It is claimed that this will more than halve the number of cruise-only passengers visiting Antarctica (Saurine, 2010) because very large cruise ships must use heavy oil. Furthermore, expedition fares are expected to rise because light oil is more expensive than heavy oil.

An article in *Australian Wildlife*, No. 1, 2004, p.81, reported that British scientists have issued a warning that tourists to Antarctica are threatening its wildlife. However, according to this entry in *Australian Wildlife* (Anon, 2004) this claim needs to be qualified because

politically and socially tourists can play a positive role in nature conservation in Antarctica (compare also Tisdell and Broadus, 1989). This article states that “it was tourists who alerted the world to mistakes in that part of the world many years ago, warning of the killing of birds to be rendered down for oil and later the dumping of rubbish from research stations”. While operators of many research stations now return rubbish to their home country, others continue to dump it in the sea. Research stations in Antarctica can have substantial adverse environmental impacts. In conclusion, this *Australian Wildlife* item claims that “The world over, it is tourists who tend to be most concerned about the conservation of any pristine landscape and its wildlife” (Anon, 2004, p.31).

Although the last point involves a comparatively sweeping claim, the results from this case study lend support to it. From Table 17, it was seen that over 92 per cent of our survey respondents said prior to their visit to Antarctica that they wanted Antarctica (including wildlife, plant life and its landscape) to be preserved in its pristine state. Support for this proposal increased to 94 per cent after their visit to Antarctica. Only a small minority of respondents opposed such preservation.

While tourists can play, and have played, a significant political, social and economic role in supporting nature conservation [consider, for example their role in fostering conservation of marine turtles in Australia, as outlined, for example in Tisdell and Wilson (2002, 2005; forthcoming, Ch. 9)], there is also a need to manage tourism, including Antarctic tourism, appropriately so as to control its possible adverse environmental consequences. Unfortunately, ideal mechanisms are not yet in place for managing Antarctic tourism and for conserving Antarctica’s natural resources. Furthermore, the consensus approach to the Antarctic Treaty System (discussed, for example, by Kriwoken and Keage, 1989) seems to be a barrier to effective governance of tourism by the Antarctic Treaty Nations. While self regulation of Antarctic tourism by IAATO members is a step forward, not all Antarctic tour operators are members of IAATO. In addition, even though self-regulation can be effective, there is no guarantee that all operators will adhere to an ‘agreed’ code of conduct.

## **11. ACKNOWLEDGEMENTS**

We wish to thank Alex Park, Nick Footner and Vincent Hoang for their research assistance and also the CRC for Sustainable Tourism for some financial support for this project. We also

wish to thank Diane Gee for administering the questionnaires on board the 'Akademik Ioffe' and Lorne Kriwoken for arranging this. We are grateful to the ship's staff for assistance, and to Peregrine Shipping Pty Ltd for permission to conduct this survey. The usual caveat applies.

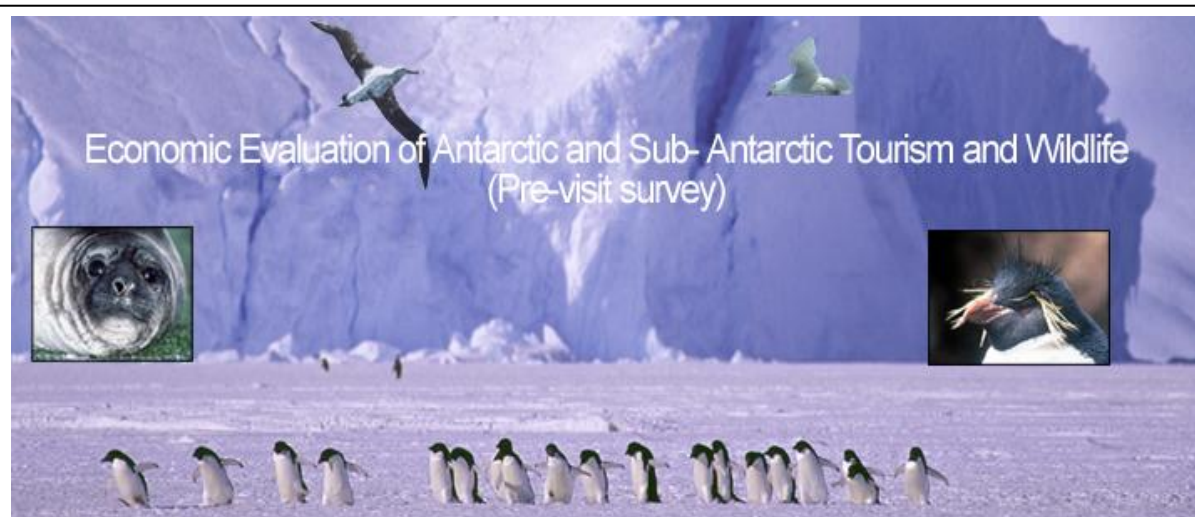
## 12. REFERENCES

- Anon (2001). Treaty meeting looks at tourism. *Australian Antarctic Magazine*, (Spring), 14.
- Anon (2004). Antarctica. *Australian Wildlife*, 1, 31.
- Anon (2009). Australian Antarctic Tourism. Pp. 1 in *Australian Antarctic and sub-Antarctic tourism: Towards a Sustainable Industry*, Cooperative Research Centre for Sustainable Tourism, Gold Coast.
- Barrio, A.M. and Roldan, M.G. (1997). Report on Antarctic Tourism numbers through the Port of Ushuaia, 1996-97. from <http://www.tierradelfuego.org.ar/antartida/tur9697eng.htm>
- IAATO. (2009a). Tourism overview. Accessed 7 January, 2010, from [www.iaato.org/tourism\\_overview.html](http://www.iaato.org/tourism_overview.html)
- IAATO. (2009b). Report of the International Association of Antarctica Tour Operators 2008-2009 submitted to the Antarctic Treaty Meeting. Baltimore 2009. IP33 rev.1. Accessed 8 January, 2010, from [www.iaato.org/info.html](http://www.iaato.org/info.html)
- IAATO. (2009c). IAATO Overview of Antarctica Tourism: 2008-2009. Antarctic Season and Preliminary Estimates for 2009-2010 Antarctic Season. Antarctic Treaty Meeting. IP86 rev.2.
- International Association of Antarctica Tour Operators. (2003). IAATO Overview of Antarctic Tourism. Antarctic Season to the Antarctic Treaty Conference, ATCM XXVI/IP, Agenda Item 10. submitted by the International Association of Antarctica Tour Operators (IAATO) 2002-2003.
- Johnson, M. and Kriwoken, L. (2007). Emerging issues of Australian Antarctic tourism: Legal and policy dimensions. Pp. 85-99 in L. Kriwoken, J. Jabour and A. D. Hemmings (Eds.), *Looking South: Australia's Antarctic Agenda*, Federation Press, Sydney.
- Johnson, M. and Kriwoken, L. (2009). Snapshot one: Emerging issues of Australian Antarctic tourism: Legal and policy dimensions. Pp. 4-7 in *Australian Antarctic and sub-Antarctic Tourism: Towards a Sustainable Industry*, Cooperative Research Centre for Sustainable Tourism, Gold Coast.
- Kriwoken, L. and Keage, P.L. (1989). Introduction: the Antarctic Treaty System. Pp. 1-6 in J. Hardmer (Ed.), *Antarctica: Policies and Policy Developments*, Centre for Resource and Environmental Studies, Australian National University, Canberra,.

- Kriwoken, L. and Rootes, D. (2000). Tourism on ice: environmental impact assessment of Antarctic tourism. *Impact Assessment and Project Appraisal*, 18(2), 138-150.
- Rubin, J. (2000). *Antarctica*, 2nd Edn., Lonely Planet Publications, Melbourne.
- Saurine, A. (2010, June 24). Antarctic safeguard will make travel more expensive: Ship ban to ease oil spill concern. *The Courier Mail*.
- Tisdell, C.A. and Broadus, J. (1989). Policy issues related to the establishment and management of marine reserves. *Coastal Management*, 17, 37-53. Reprinted in C.Tisdell (2002), *The Economics of Conserving Wildlife and Natural Areas*, Edward Elgar, Cheltenham, UK.
- Tisdell, C.A. and Wilson, C. (2002). Economic, educational and conservation benefits of sea turtle based ecotourism: A study focused on Mon Repos. *Wildlife Tourism Report No. 20*, Cooperative Research Centre for Sustainable Tourism, Griffith University, Gold Coast, Australia.
- Tisdell, C.A. and Wilson, C. (2005). Does tourism contribute to sea turtle conservation? *MAST/ Maritime Studies - Special Issue: Marine Turtles as Flagships*, 3(2), 145-167.
- Tisdell, C.A. and Wilson, C. (forthcoming). *Nature-based Tourism and Conservation*, Edward Elgar, Cheltenham, UK and Northampton, MA, USA.
- Tisdell, C.A., Wilson, C. and Swarna Nantha, H. (2008). Contingent valuation as a dynamic process. *The Journal of Socio-Economics*, 37, 1443-1458.

# **APPENDIX**

## **Pre-Visit and Post-Visit Questionnaires Distributed to Tourists on the “Akademik Ioffe” on its Antarctic Voyage in January 2003**



**This study is being conducted with support from the *CRC for Sustainable Tourism* by the *University of Queensland* and the *University of Tasmania* (Australia) and we would like your help. We need information about Antarctic/Sub Antarctic-based tourism. Could you please spare a little time to answer some of our questions? Your answers will be confidential and will be used only for scientific purposes. It is not necessary to divulge your name or address for this study. Please hand over the completed survey form in the next few days in the envelope provided to a crew member or the person who handed over this form to you. Thank you very much for your cooperation.**

Your assigned survey number .....

**Important:** The assigned number will be used to match your replies with a brief return survey.

### **Preliminary Information**

1. Your name or, if you wish to remain anonymous, a pseudonym that you should also use to complete a second form on your return journey  
.....
2. Date of completion of this form: Day ..... Month ..... Year .....
3. Name of cruise ship .....  
Port of departure .....
4. Date of departure of cruise .....
5. Proposed date of return of cruise .....
6. Brief indication of route of cruise (main places visited)  
.....  
.....  
.....

7. In which country do you normally reside?  
.....

8. What is the main unit of currency of the country in which you permanently reside? (For example, for the US it is US dollars, for Canada it is Canadian dollars, for many European countries it is Euros, for Australia, it is Australian dollars)  
.....

**Please state all answers to questions below involving money in your home currency.**

9. Is this your first visit to the South Polar Region? ☐ Yes ☐ No

10. If **No**, how many times have you visited it before? .....

11. Have you visited the North Pole? ☐ Yes ☐ No

12. Are you travelling alone or are you accompanied on this journey?

☐ Alone ☐ Accompanied

13. If accompanied, by how many persons? Adults ..... Children (under 15) .....

14. In terms of your home currency, **how much do you expect that you/ your accompanying partner/family will have spent per person (approximately) specifically for this journey by the time it ends?** [Include what you have spent to date **plus** extra purchases such as special clothing, books, etc and what you expect to spend before the end of the journey.]

Amount in home currency ..... for entire journey for ..... person(s)

15. How **much more** would you have been prepared to spend for this journey before deciding **not to go** on it and to do something else instead?

Amount in home currency ..... **per person**

Any comments?.....  
.....  
.....

### **Knowledge about Antarctica**

1. Do you regard your current knowledge of Antarctica/sub-Antarctica as

Excellent ☐ Good ☐ Average ☐ Poor ☐

2. Have you read widely about Antarctica? Yes ☐ No ☐

3. Have you watched **many** TV programmes on Antarctica? Yes ☐ No ☐
4. Are you interested in Antarctic wildlife? Yes ☐ No ☐
5. If **Yes**, is your interest of Antarctic wildlife mainly in:  
(you may tick more than one box)  
☐ Penguins      ☐ Other sea birds      ☐ Seals and sea lions  
☐ Whales and dolphins      ☐ All wildlife      ☐ Any other .....
6. What is special about Antarctic wildlife? (you may tick more than one box)  
☐ Most of Antarctic wildlife are not found elsewhere  
☐ They can be seen easily in large numbers  
☐ The special adaptations of Antarctic wildlife  
 Any other (1) ..... (2) .....
7. Were you aware that commercial hunting of seals and penguins has taken place during the 19<sup>th</sup> and 20<sup>th</sup> century in the Sub-Antarctic islands? Yes ☐ No ☐

### **Wildlife and Tourism**

1. How important was the possibility of seeing Antarctic/Sub-Antarctic wildlife in your decision to come on this journey?  
☐ Very important  
☐ Important  
☐ Not very important  
☐ Of no importance
2. If there was **no wildlife** to be seen in the South Polar Region, would you have still decided to come on this cruise, given your present costs? Yes ☐ No ☐
3. If **No**, and the cruise costs were much less, would you change your mind and go on this cruise, **despite not being able to see wildlife**?

Yes ☐ No ☐

Why? .....

4. If **Yes**, by how much in terms of your home currency would the cruise price have to **be reduced** for you to take this cruise?

.....



5. Please tick (✓) the appropriate column to indicate how important the following **features or attributes of Antarctica/Sub-Antarctica** were in your decision to join this cruise

	<b>Very important</b>	<b>Important</b>	<b>Not very important</b>	<b>Of no importance</b>
Wildlife				
Landscapes and seascapes				
Connections with explorers				
Different or unique environment				
Few others have visited it				
Unspoilt wilderness				
The thrill of expedition				
Ship cruise pleasures				
Continent without permanent human habitations				
Antarctic Summer				
Other (please specify)				

6. Are you a specialist bird-watcher? **Yes** ☐ **No** ☐

If **Yes**, approximately how many field trips do you undertake away from home **per year**? .....

7. Are you a member of any nature conservation organizations? **Yes** ☐ **No** ☐

If **Yes**, please state names of organizations

(1) ..... (2) ..... (3)  
.....

8. How would you rate your attitudes towards nature conservation?

- ☐ Extremely strong advocate                      ☐ Strong advocate  
☐ Moderate advocate                                      ☐ Neutral towards this subject  
☐ More oriented towards development than conservation

9. Please tick in the second column if you **expect to see** any of the following wildlife in Antarctica or Sub-Antarctica during this cruise. Would it increase your satisfaction (1) **a little**, (2) **much**, (3) **very much**, or (4) **not at all** to see the following wildlife? **Please put the appropriate number in the last column.**

	<b>Expect to see If <u>Yes</u>, tick (✓)</b>	<b>Added satisfaction if seen (Please put the appropriate numbers below)</b>
Whales and dolphins		
Penguins		
Seals (and relatives)		
Polar seabirds (other than penguins)		

10. List up to **eight species** of wildlife that you would especially like to see and hope to see on this cruise. List the species that **you most want to see** first and the remainder in descending order

**[Please see note at end of table to fill out hypothetical donation amount].**

<b>Species (Name)</b>	<b>Hypothetical Donation* (in your home currency) (Please read note)</b>	<b>Species (Name)</b>	<b>Hypothetical Donation* (in your home currency) (Please read note)</b>
1		5	
2		6	
3		7	
4		8	

**\*Note:** It is possible that the continuing existence of each of these species may be threatened by environmental changes such as global warming, the harvesting of **krill** or, in some cases, unknown factors. If you were asked for a **one-off payment** to support measures (such as research or policy changes) that would prevent the extinction of the individual species mentioned by you, what is the donation you would make? List this in your home currency against the species mentioned in the corresponding column. When you consider each, assume that **no** donation is required to save the others. **Although this question is hypothetical, please assume that it is real and that it has to come from your budget. Please consider your daily expenses before deciding on the donation.**

11. If these species were **not** in your previous list, and you were asked for a **similar one-off donation**, how much would you **donate in terms of your home currency**.

Species (Tick if you expect to see them)	Donation in your home currency
1. Emperor Penguins <input type="checkbox"/>	
2. Rockhopper Penguins <input type="checkbox"/>	
3. Southern Elephant Seals <input type="checkbox"/>	
4. Blue Whales <input type="checkbox"/>	
5. Humpback Whales <input type="checkbox"/>	
6. Minke Whales <input type="checkbox"/>	
7. Orca (Killer Whales) <input type="checkbox"/>	
8. Snow Petrels <input type="checkbox"/>	
9. Antarctic Skuas <input type="checkbox"/>	
10. Wilson's Storm Petrels <input type="checkbox"/>	

### **Opinions on Antarctica**

1. Do you believe that global warming is melting icebergs in Antarctica? **Yes** ☐ **No** ☐

2. If **Yes**, would you like action to be taken to reduce such melting? **Yes** ☐ **No** ☐

If **Yes**, why (1) ..... (2) .....

If **No**, why (1) ..... (2) .....

3. Do you think that **krill** harvesting should continue in Antarctica? **Yes** ☐ **No** ☐

4. If **No**, are you in favour of limited krill harvesting? **Yes** ☐ **No** ☐

5. Are you in favour of Antarctica's vast resources (e.g. petroleum, minerals, water) being exploited?

**Yes** ☐ **No** ☐

6. Are you in favour of the Antarctic continent and surrounding seas being declared a world park and managed under the auspices of the United Nations and/or by the twelve Antarctic Treaty nations?

**Yes** ☐ **No** ☐

7. Are you in favour of **increased** tourism activity in Antarctica?

**Yes** ☐ **No** ☐

If **Yes**, why (1) .....

If **No**, why (1) .....

8. Do you want Antarctica (including the wildlife, plant life and its landscape) to be preserved in its pristine state? **Yes** ☐ **No** ☐

9. If **Yes**, is it because (you may tick more than one box)

- ☐ It is unique
- ☐ It has tourism potential
- ☐ I would like my children and others to enjoy it
- ☐ I would like to know that it remains unspoilt
- ☐ It has great resources that could be used in the future
- ☐ It has a large influence on the Earth's climate

10. If an organization such as the *United Nations* were to raise money to declare **Antarctica** and its surrounding seas as a **world park** and conduct further research into its unique wildlife and landscapes/seascapes, would you be willing to make an **annual contribution** for the next ten years?

Yes ☐ No ☐

11. If **Yes**, what is the maximum amount you would like to contribute **per year** in your currency for the next 10 years?

.....

If **No**, what are your reasons? .....

**Background Information (only to be used for general processing of responses)**

1. Gender of person filling out the form? Male ☐ Female ☐

2. To what age group do you belong?

20 – 30 ☐ 31 – 40 ☐ 41 – 50 ☐ 51 – 60 ☐

61 – 70 ☐ 71 – 80 ☐ 81 + ☐

3. Indicate your highest educational qualification

Primary only ☐ Some junior schooling ☐ Completed year 10 secondary or equivalent ☐

Completed year 12 or equivalent ☐ Trade certificate or equivalent ☐

Diploma or equivalent ☐ Degree or equivalent ☐ Post-graduate degree or equivalent ☐ Any other .....

4. Your family income level per annum in your home currency?

**Note:** This is **confidential** and for **scientific research only**

Below 25,000 ☐ 25,001 - 50,000 ☐ 50,001 - 75,000 ☐ 75,001 - 100,000 ☐

100,001 - 125,000 ☐ 125,001 - 150,000 ☐ 150,001 – 175,000 ☐

175,001 - 200,000 ☐ 200,001 - 225,000 ☐ 225,001 and above ☐

Any other amount .....

5. Would you want to visit Antarctica again if it costs the same as now? Yes ☐ No ☐

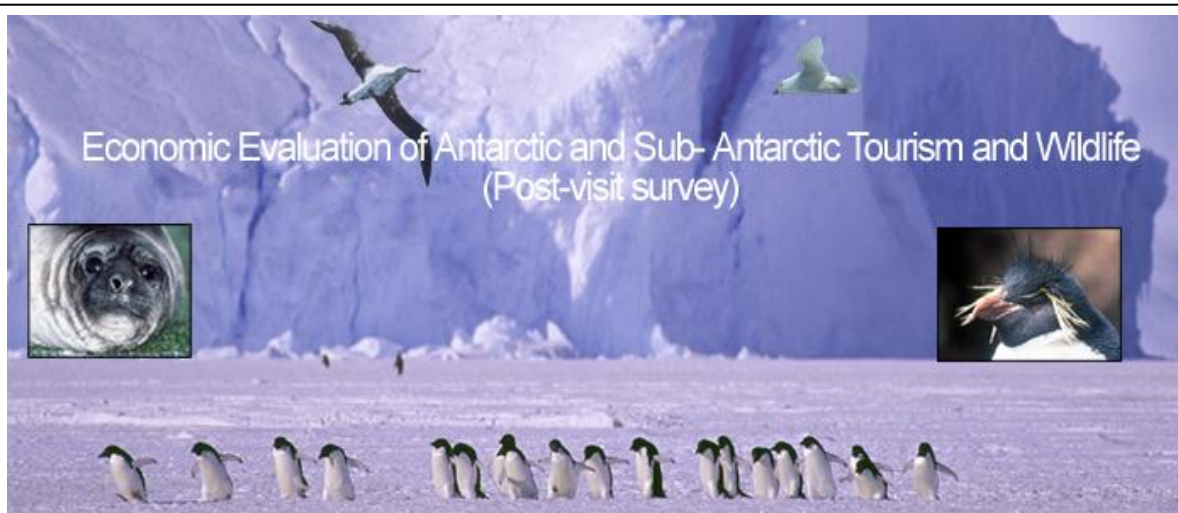
**THANK YOU FOR YOUR COOPERATION**

Contact details of researchers:

Dr Lorne Kriwoken - E-mail: L.K. [Kriwoken@utas.edu.au](mailto:Kriwoken@utas.edu.au) - University of Tasmania

Professor Clem Tisdell - E-mail: [c.tisdell@economics.uq.edu.au](mailto:c.tisdell@economics.uq.edu.au) - University of Queensland

Dr Clevo Wilson - E-mail: [clevo.wilson@uq.edu.au](mailto:clevo.wilson@uq.edu.au) - University of Queensland



**This is the Second Evaluation Form (post-visit survey) of the study you participated in during your outbound journey (First Evaluation) to Antarctic/Sub Antarctic islands which is being conducted with support from the *CRC for Sustainable Tourism* by the *University of Queensland* and the *University of Tasmania* (Australia). Could you please spare a little time to answer a few more questions? Your answers, as always, will be confidential and will be used only for scientific purposes.** Please hand over the completed survey form in the **next few days** (before the ship reaches the port of departure) in the envelope provided to a crew member or the person who handed over this form to you. Thank you very much for your cooperation.

**Important:** Please use the same survey number you used during the filling out of the **outbound survey form (First Evaluation)**.

Your assigned survey number .....

**Please state all answers to questions below involving money in your home currency.**

### **Preliminary Information**

1. Your name or pseudonym that you used to complete the first survey form on your outbound journey.....
2. Date of completion of this form: Day ..... Month ..... Year .....
- 3 Name of cruise ship.....
4. Date of departure of cruise from Antarctica .....
5. Brief indication of route of cruise (main places visited)  
.....  
.....  
.....  
.....

6. Was your Antarctic experience
- ☐ less impressive than you expected
  - ☐ more impressive than you expected
  - ☐ about the same as you expected

7. How much do you **now feel (after your experience of Antarctica)** you would have been justified in spending on this journey? Please indicate the maximum amount. **The value can be less, equal or more than the amount you/partner/family actually spent.**

Amount in home currency ..... for entire journey for ..... person(s)

Any comments? .....  
.....  
.....

### **Knowledge about Antarctica**

1. Do you consider your knowledge of Antarctica/sub-Antarctica after your visit to be

Excellent ☐    Good ☐    Average ☐    Poor ☐

2. Have you become **more** interested in Antarctic wildlife following your visit?

☐ Yes ☐ No

3. If **Yes**, is your increase in interest of Antarctic wildlife mainly in relation to:  
(you may tick more than one box)

☐ Penguins                      ☐ Other sea birds                      ☐ Seals and their relatives  
☐ Whales and dolphins    ☐ All wildlife                      ☐ Any other .....

4. What is special about Antarctic wildlife?

(you may tick more than one box)

☐ Most of Antarctic wildlife are not found elsewhere  
☐ They can be seen easily in large numbers  
☐ The special adaptations of Antarctic wildlife

Any other (1) ..... (2) .....

5. Did you become aware of commercial hunting of seals and penguins in the 19<sup>th</sup> and 20<sup>th</sup> century in the Sub-Antarctic islands during the visit to Antarctica?

☐ Yes    ☐ No                      ☐ Knew about it before the cruise

6. Do you think you have **learnt more** about Antarctica and its wildlife as a result of this cruise?

☐ Yes ☐ No

7. Did you become **more aware** of conservation issues of Antarctic wildlife as a result of your cruise?

☐ Yes ☐ No

8. Do you think that Antarctic wildlife should be conserved?

☐ Yes ☐ No

### **Wildlife and Tourism**

1. How important was seeing Antarctic/Sub-Antarctic wildlife during this cruise?

- ☐ Very important  
☐ Important  
☐ Not very important  
☐ Not of any importance

2. If you are a specialist bird-watcher did you see

- ☐ all the birds you wanted to see  
☐ more than half of the birds you wanted to see  
☐ less than half of the birds you wanted to see

3. With your bird-watching experience in Antarctica were you

- ☐ Very satisfied ☐ Satisfied ☐ Not satisfied

4. If you did not see **any wildlife**, would you have still enjoyed your cruise?

☐ Yes ☐ No

5. Please tick (✓) the appropriate column to indicate how important the following features or attributes of **Antarctica/Sub-Antarctica** were **during** this cruise

	<b>Very important</b>	<b>Important</b>	<b>Limited in importance</b>	<b>Of no importance</b>
Wildlife				
Landscapes and seascapes				
Connections with explorers				
Different or unique environment				
Few others have visited it				
Unspoilt wilderness				
The thrill of expedition				
Ship cruise pleasures				
Continent without permanent human habitations				
Antarctic Summer				
Other (please specify)				

6. Tick the second column if you **saw any of the following wildlife in Antarctica or Sub-Antarctica** during the cruise. Did they increase your satisfaction (1) **a little** (2) **much** (3) **very much** or (4) **not at all** to see the following wildlife? **Please put the appropriate number in the last column.**

Species	Saw the species? If Yes, please tick (✓)	Added satisfaction if seen (Please put the appropriate numbers below)
Whales and dolphins		
Penguins		
Seals (and relatives)		
Polar seabirds (other than penguins)		

7. List up to **eight species** of wildlife that you wanted to see and which you encountered on this cruise. List **first** the species that you **liked most** and the remainder in descending order of your preference for these. [**Please see note at end of table to fill out hypothetical donation amount**].

Species Name	Hypothetical Donation* Please read note	Species Name	Hypothetical Donation* Please read note
1		5	
2		6	
3		7	
4		8	

\* **Note:** It is possible that the continuing existence of each of these species may be threatened by environmental changes such as global warming, the harvesting of **krill** or, in some cases, unknown factors. If you were asked for a **one-off payment** to support measures (such as research or policy changes) that would prevent the extinction of the individual species mentioned by you, what is the donation you would make? List this in your home currency against the species mentioned in the corresponding column. When you consider each, assume that no donation is required to save the others. **Although this question is hypothetical, please assume that it is real and that it has to come from your budget. Please consider your daily expenses before deciding on the donation.**



8. If the following species **were not** in your previous list, and you were asked for a **similar one-off donation**, how much would you donate in terms of your home currency **after your experience with these species.**

Species (Tick if you expect to see them)	Donation in your home currency
1. Emperor Penguins <input type="checkbox"/>	
2. Rockhopper Penguins <input type="checkbox"/>	
3. Southern Elephant Seals <input type="checkbox"/>	
4. Blue Whales <input type="checkbox"/>	
5. Humpback Whales <input type="checkbox"/>	
6. Minke Whales <input type="checkbox"/>	
7. Orca (Killer Whales) <input type="checkbox"/>	
8. Snow Petrels <input type="checkbox"/>	
9. Antarctic Skuas <input type="checkbox"/>	
10. Wilson's Storm Petrels <input type="checkbox"/>	

### **Opinions on Antarctica**

1. Do you believe that global warming is melting icebergs in Antarctica? Yes ☐ No ☐

2. If **Yes**, would you like action to be taken to reduce such melting? Yes ☐ No ☐

If **Yes**, why (1) ..... (2) .....

If **No**, why (1) ..... (2) .....

3. Do you think that **krill** harvesting should continue in Antarctica? Yes ☐ No ☐

4. If **No**, are you in favour of limited **krill** harvesting? Yes ☐ No ☐

5. Are you in favour of Antarctica's vast resources (e.g. petroleum, minerals, water) being exploited?

Yes ☐ No ☐

6. Are you in favour of the Antarctic continent and surrounding seas being declared a world park and managed under the auspices of the United Nations and/or by the twelve Antarctic Treaty nations? Yes ☐ No ☐

7. Are you in favour of **increased** tourism activity in Antarctica?

Yes ☐ No ☐

If **Yes**, why (1) ..... (2) .....

If **No**, why (1) ..... (2) .....

8. Do you want Antarctica (including the wildlife, plant life and its landscape) to be preserved in its pristine state? Yes ☐ No ☐

9. If **Yes**, is it because (you may tick more than one box)
- ☐ It is unique
  - ☐ It has tourism potential
  - ☐ I would like my children and others to enjoy it
  - ☐ I would like to know that it remains unspoilt
  - ☐ It has great resources that could be used in the future
  - ☐ It has a large influence on the earth's climate
10. If an organization such as the *United Nations* were to raise money to declare Antarctica and its surrounding seas as a **world park** and conduct further research into its unique wildlife and landscapes, would you be willing to make an annual contribution for the next ten years?
- Yes ☐ No ☐
11. If **Yes**, what is the maximum amount you would like to contribute **per year** in your currency for the next 10 years
- .....
- If **No**, what are your reasons? .....
12. If you are **not** already a member of a nature conservation organization do you wish to join one after your Antarctic experience?
- Yes ☐ No ☐
- If **No**, why? .....
13. If **Yes**, please state organizations that you would consider joining
- (1)..... (2) .....
14. How would you rate your attitudes towards nature conservation **after** your experience of Antarctica?
- ☐ Extremely strong advocate
  - ☐ Strong advocate
  - ☐ Moderate advocate
  - ☐ Neutral towards this subject
  - ☐ More oriented towards development than conservation
15. Would you want to visit Antarctica again if costs are the same as now? Yes ☐ No ☐
16. Any comments are welcome.....
- .....
- .....
- .....

#### THANK YOU FOR YOUR COOPERATION

Contact details of researchers:

Dr Lorne Kriwoken - E-mail L.K. [Kriwoken@utas.edu.au](mailto:Kriwoken@utas.edu.au) - University of Tasmania

Professor Clem Tisdell - E-mail: [c.tisdell@economics.uq.edu.au](mailto:c.tisdell@economics.uq.edu.au) - University of Queensland

Dr Clevo Wilson - E-mail: [clevo.wilson@uq.edu.au](mailto:clevo.wilson@uq.edu.au) - University of Queensland

## PREVIOUS WORKING PAPERS IN THE SERIES ECONOMICS, ECOLOGY AND ENVIRONMENT

For a list of working papers 1-100 in this series, visit the following website:

[http://www.uq.edu.au/economics/PDF/staff/Clem\\_Tisdell\\_WorkingPapers.pdf](http://www.uq.edu.au/economics/PDF/staff/Clem_Tisdell_WorkingPapers.pdf) or see lists in papers 101 on.

1. Knowledge and Willingness to Pay for the Conservation of Wildlife Species: Experimental Results Evaluating Australian Tropical Species, by Clem Tisdell and Clevo Wilson, May 2004.
2. Antarctic Tourists, Wildlife and the Environment: Attractions and Reactions to Antarctica, by Clem Tisdell, May 2004.
3. Birds in an Australian Rainforest: Their Attraction for Visitors and Visitors' Ecological Impacts, by Clem Tisdell and Clevo Wilson, May 2004.
4. Nature-Based Tourism and the Valuation of its Environmental Resources: Economic and Other Aspects by Clem Tisdell, May 2004.
5. Glow Worms as a Tourist Attraction in Springbrook National Park: Visitor Attitudes and Economic Issues, by Clem Tisdell, Clevo Wilson and David Merritt, July 2004.
6. Australian Tropical Reptile Species: Ecological Status, Public Valuation and Attitudes to their Conservation and Commercial Use, by Clem Tisdell, Clevo Wilson and Hemanath Swarna Nantha, August 2004.
7. Information and Wildlife Valuation: Experiments and Policy, by Clem Tisdell and Clevo Wilson, August 2004.
8. What are the Economic Prospects of Developing Aquaculture in Queensland to Supply the Low Price White Fillet Market? Lessons from the US Channel Catfish Industry, by Thorbjorn Lyster and Clem Tisdell, October 2004.
9. Comparative Public Support for Conserving Reptile Species is High: Australian Evidence and its Implications, by Clem Tisdell, Clevo Wilson and Hemanath Swarna Nantha, October 2004.
10. Dependence of public support for survival of wildlife species on their likeability by Clem Tisdell, Clevo Wilson and Hemanath Swarna Nantha, October 2004.
11. Dynamic Processes in Contingent Valuation: A Case Study Involving the Mahogany Glider by Clem Tisdell, Clevo Wilson and Hemanath Swarna Nantha, November 2004.
12. Economics, Wildlife Tourism and Conservation: Three Case Studies by Clem Tisdell and Clevo Wilson, November 2004.
13. What Role Does Knowledge of Wildlife Play in Providing Support for Species' Conservation by Clevo Wilson and Clem Tisdell, December 2004.
14. Public Support for Sustainable Commercial Harvesting of Wildlife: An Australian Case Study by Clem Tisdell, Clevo Wilson and Hemanath Swarna Nantha, December 2004.
15. Endangerment and Likeability of Wildlife Species: How Important are they for Proposed Payments for Conservation by Clem Tisdell, Hemanath Swarna Nantha and Clevo Wilson, December 2004.
16. How Knowledge Affects Payment to Conserve and Endangered Bird by Clevo Wilson and Clem Tisdell, February 2005.
17. Public Choice of Species for the Ark: Phylogenetic Similarity and Preferred Wildlife Species for Survival by Clem Tisdell, Clevo Wilson and Hemanath Swarna Nantha, March 2005.
18. Economic Incentives for Global Conservation of Wildlife: New International Policy Directions by Clem Tisdell, March 2005.
19. Resource Entitlements of Indigenous Minorities, Their Poverty and Conservation of Nature: Status of Australian Aborigines, Comparisons with India's Tribals, Theory and Changing Policies Globally by Clem Tisdell, March 2005.
20. Elephants and Polity in Ancient India as Exemplified by Kautilya's *Arthashastra* (Science of Polity) by Clem Tisdell, March 2005.
21. Sustainable Agriculture by Clem Tisdell, April 2005.

22. Dynamic Processes in the Contingent Valuation of an Endangered Mammal Species by Clem Tisdell, Clevo Wilson and Hemanath Swarna Nantha, April 2005.
23. Knowledge about a Species' Conservation Status and Funding for its Preservation: Analysis by Clem Tisdell, June 2005.
24. Public Valuation of and Attitudes towards the Conservation and Use of the Hawksbill Turtle: An Australian Case Study by Clem Tisdell, Hemanath Swarna Nantha and Clevo Wilson, June 2005.
25. Comparison of Funding and Demand for the Conservation of the Charismatic Koala with those for the Critically Endangered Wombat *Lasiorninus krefftii* by Clem Tisdell and Hemanath Swarna Nantha, June 2005.
126. Management, Conservation and Farming of Saltwater Crocodiles: An Australian Case Study of Sustainable Commercial Use by Clem Tisdell and Hemanath Swarna Nantha, August 2005.
127. Public Attitudes to the Use of Wildlife by Aboriginal Australians: Marketing of Wildlife and its Conservation by Clem Tisdell and Hemanath Swarna Nantha, August 2005.
128. Linking Policies for Biodiversity Conservation with Advances in Behavioral Economics by Clem Tisdell, August 2005.
129. Knowledge about a Species' Conservation Status and Funding for its Preservation: Analysis by Clem Tisdell, August 2005.
130. A Report on the Management of Saltwater Crocodiles (*Crocodylus porosus*) in the Northern Territory: Results of a Survey of Pastoralists by Clem Tisdell, Clevo Wilson and Hemanath Swarna Nantha, September 2005.
131. Crocodile Farms and Management of Saltwater Crocodiles in Northern Territory: Results of a Survey of NT Crocodile Farmers Plus Analysis of Secondary Information by Clem Tisdell, September 2005.
132. The Environment and the Selection of Aquaculture Species and Systems: An Economic Analysis by Clem Tisdell, October 2005.
133. The History and Value of the Elephant in Sri Lankan Society by Ranjith Bandara and Clem Tisdell, November 2005.
134. Economics of Controlling Livestock Diseases: Basic Theory by Clem Tisdell, November 2006.
135. Poverty, Political Failure and the Use of Open Access Resources in Developing Countries by Clem Tisdell, November 2006.
136. Global Property Rights in Genetic Resources: An Economic Assessment by Clem Tisdell, November 2006.
137. Notes on the Economics of Fish Biodiversity: Linkages between Aquaculture and Fisheries by Clem Tisdell, November 2006.
138. Conservation of the Proboscis Monkey and the Orangutan in Borneo: Comparative Issues and Economic Considerations by Clem Tisdell and Hemanath Swarna Nantha, March 2007.
139. Economic Change and Environmental Issues: Policy Reforms and Concerns in Australian Agriculture, by Clem Tisdell, April 2007.
140. Institutional Economics and the Behaviour of Conservation Organizations: Implications for Biodiversity Conservation by Clem Tisdell, March 2007
141. Poverty, Policy Reforms for Resource-use and Economic Efficiency: Neglected Issues by Clem Tisdell, May 2007.
142. The State of the Environment and the Availability of Natural Resources by Clem Tisdell, May 2007.
143. Economics of Pearl Oyster Culture by Clem Tisdell and Bernard Poirine, July 2007.
144. The Economic Importance of Wildlife Conservation on the Otago Peninsula – 20 Years on by Clem Tisdell, November, 2007.
145. Valuing the Otago Peninsula: The Economic Benefits of Conservation by Clem Tisdell, November 2007.
146. Policy Choices about Agricultural Externalities and Sustainability: Diverse Approaches, Options and Issues by Clem Tisdell, November, 2007.
147. Global Warming and the Future of Pacific Island Countries by Clem Tisdell, November 2007.

148. Complex Policy Choices about Agricultural Externalities: Efficiency, Equity and Acceptability by Clem Tisdell, June 2008.
149. Wildlife Conservation and the Value of New Zealand's Otago Peninsula: Economic Impacts and Other Considerations by Clem Tisdell, June 2008.
150. Global Property Rights in Genetic Resources: Do They Involve Sound Economics? Will They Conserve Nature and Biodiversity? By Clem Tisdell, August 2008.
151. Supply-side Policies to Conserve Biodiversity and Save the Orangutan from Oil Palm Expansion: An Economic Assessment. By Clem Tisdell and Hemanath Swarna Nantha, September, 2008.
152. The Orangutan-Oil Palm Conflict: Economic Constraints and Opportunities for Conservation by Hemanath Swarna Nantha and Clem Tisdell, October 2008.
153. Economics, Ecology and the Development and Use of GMOs: General Considerations and Biosafety Issues by Clem Tisdell, October 2008.
154. Agricultural Sustainability and the Introduction of Genetically Modified Organisms (GMOs) by Clem Tisdell, February, 2009.
155. Notes on Biodiversity Conservation, The Rate of Interest and Discounting by Clem Tisdell, April, 2009.
156. Is Posner's Principle of Justice an Adequate Basis for Environmental Law? by Clem Tisdell, June 2009.
157. The Sustainability of Cotton Production in China and Australia: Comparative Economic and Environmental Issues By Xufu Zhao and Clem Tisdell, June 2009.
158. The Precautionary Principle Revisited: Its Interpretations and their Conservation Consequences by Clem Tisdell, September, 2009.
159. The Production of Biofuels: Welfare and Environmental Consequence for Asia by Clem Tisdell, September, 2009.
160. Environmental Governance, Globalisation and Economic Performance by Clem Tisdell, November 2009.
161. Managing Forests for Sustainable Economic Development: Optimal Use and Conservation of Forests by Clem Tisdell, February 2010.
162. Comparative Costs and Conservation Policies for the Survival of the Orangutan and Other Species: Includes an Example by Clem Tisdell and Hemanath Swarna Nantha, May 2010.
163. Notes on the Economics of Control of Wildlife Pests by Clem Tisdell, May 2010
164. Are tourists rational? Destination decisions and other results from a survey of visitors to a North Queensland natural site – Jourama Falls by Clem Tisdell, June 2010.
165. Conservation Value by Clem Tisdell, June 2010.
166. The Influence of Public Attitudes on Policies for Conserving Reptiles by Clem Tisdell, July 2010.
167. Core Issues in the Economics of Biodiversity Conservation by Clem Tisdell, July 2010.
168. The Survival of a Forest-Dependent Species and the Economics of Intensity of Logging: A Note by Clem Tisdell, August 2010.
169. A Case Study of an NGOs Ecotourism Efforts: Findings Based on a Survey of Visitors to its Tropical Nature Reserve by Clem Tisdell, August, 2010.
170. Sharing Nature's Wealth through Wildlife Tourism: Its Economic, Sustainability and Conservation Benefits by Clem Tisdell, August, 2010
171. Economic Growth and Transition in Vietnam and China and its Consequences for their Agricultural Sectors: Policy and Agricultural Adjustment Issues by Clem Tisdell, September, 2010.
172. World Heritage Listing of Australian Natural Sites: Effects on Tourism, Economic Value and Conservation by Clem Tisdell, October, 2010.